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*Eunicites orobicus* n. sp. (Annelida, Polychaeta):  
a new eunicid polychaete from the Lower Rhaetian  
(Upper Triassic) of Italian Prealps  
(Ponte Giurino, Lombardy)

**Abstract** – The eunicid polychaete *Eunicites orobicus* n. sp. from the Rhaetian (Upper Triassic) of Italian Prealps (Ponte Giurino, Lombardy) is described here. It is the second whole-preserved eunicid species recorded within Triassic and the second polychaete specimen found in the Riva di Solto Shale.

**Key words** – Annelida, Polychaeta, Triassic, Italy.

**Riassunto** – *Eunicites orobicus* n. sp. (Annelida, Polychaeta): un nuovo polichete eunicide del Retico Inferiore (Triassico superiore) delle Prealpi italiane (Ponte Giurino, Lombardia).

Viene descritto *Eunicites orobicus* n. sp., polichete eunicide proveniente dalla formazione delle Argilliti di Riva di Solto, affiorante in località Ponte Giurino, nelle Prealpi Orobiche (Valle Imagna, Lombardia). *Eunicites orobicus* n. sp. è la seconda specie di eunicide a conservazione eccezionale conosciuto per il Triassico e il secondo esemplare di polichete trovato nelle Argilliti di Riva di Solto.

**Parole chiave** – Annelida, Polychaeta, Triassico, Italia.

## Introduction

In the last thirty years the increasing interest for some previously neglected *taxa* has led to the description of some new genera and species of whole-preserved errant polychaetes from Paleozoic, Mesozoic and Cenozoic strata. With regard to the Mesozoic, a new aphroditid species has been reported from the Olenekian (Lower Triassic) of north-western Madagascar (Alessandrello, 1990a) and has been assigned to the genus *Paleoaphrodite* Alessandrello & Teruzzi, 1986. The same genus has been recorded with two species in the Lower Callovian (Middle Jurassic) of La Voulte-sur-Rhône, south-eastern France (Alessandrello *et al.*, 2004, in press), with one species in the Middle Cenomanian (Upper Cretaceous) of Haqel, Lebanon (Bracchi & Alessandrello, 2004, in press). These Mesozoic *Lagerstätten* show a notable variety in the polychaete fauna, with regard both to Eunicida and Phyllodocida. In addition to *Paleoaphrodite*, some Phyllodocida have been recorded with a new goniadid genus and an unrelated aphroditoidean from Lebanon and France respectively. While the

Eunicida are absent in the La Voulte-sur-Rhône outcrop, they occur in the Sinemurian (Lower Jurassic) of Osteno, northern Italy, with the lumbrinerid *Melanoraphia* Arduini, Pinna & Teruzzi, 1982, in the Kimmeridgian (Upper Jurassic) of Solnhofen (Ehlers, 1868 and 1869), Bavaria, with the eunicid *Eunicites* Ehlers, 1868, the lumbrinerid *Lumbriconereites* Ehlers, 1869 and the amphinomid *Meringosoma* Ehlers, 1869, and they show a great variety in the sub-litographic limestones of Haqel (Alessandrello & Teruzzi, 1986a; Bracchi & Alessandrello, 2004, in press). Through the investigation of the polychaete fauna from this last outcrop, Bracchi & Alessandrello (2004, in press) found that the lumbrinerids represented the most widespread free-living polychaetes, followed by the eunicid *Eunicites*, the oeononids and a new family tentatively placed along the oeononid-dorvilleid line. Full-preserved *Eunicites* originated also from the *Buntsandstein* (Lower Triassic) of Grès a Voltzia, eastern France (Gall & Grauvogel, 1966), and from the Eocene of Monte Bolca, northern Italy (Alessandrello, 1990b).

The presence of polychaete annelids in the Upper Triassic of Italian Prealps has been already recorded (Alessandrello & Teruzzi, 1986b; Stefani *et al.*, 1992) thanks to the description of *Paleoaphrodite raetica* Alessandrello & Teruzzi, 1986 from Ponte Giurino (Valle Imagna, Bergamo), the same site the studied material comes from. In Ponte Giurino the Riva di Solto Shale outcrops with finely laminated black shales (Gnaccolini, 1965; Jadoul, 1985; Paganoni & Cirilli, 1995; Paganoni & Renesto, 1995), that preserve both invertebrates and vertebrates (Stefani *et al.*, 1992). The Ponte Giurino assemblage includes insects (Whalley, 1986; Bechly, 1997), decapod (Garassino & Teruzzi, 1993) and thylacocephalan crustaceans (Arduini & Brasca, 1984; Arduini, 1988), but it is mostly famous for its vertebrate fauna, that include both cartilaginous (Tintori, 1980) and bony fish (Tintori *et al.*, 1985; Tintori & Sassi, 1987 and 1992; Arratia & Tintori, 2001), such as the selachian *Pseudodalatias* (Sykes, 1971), the basal teleosts known as 'pholidophoriforms', the pycnodontid *Brembodus* Tintori, 1981, the reptile-like fish *Saurichthys* (Agassiz, 1834), the macrosemiid *Legnonotus* Egerton, 1854, the dapediids *Dandya* White & Moy-Thomas, 1940 and *Dapedium* Leach, 1822, as well as the gliding fish *Thoracopterus* Bronn, 1858. With regard to the reptiles, the enigmatic archosauromorph *Drepanosaurus* Pinna, 1980 (Renesto & Paganoni, 1995) and a juvenile specimen of *Eudimorphodon* Zambelli, 1973 (Wild, 1995), the oldest pterosaur known, have been recorded.

The material examined here belongs to the paleontological collections of the Museo Civico di Scienze Naturali "E. Caffi" in Bergamo.

### Systematic Paleontology

Phylum Annelida Lamarck, 1809

Class Polychaeta Grube, 1850

Order Eunicida Dales, 1962

Family Eunicidae Berthold, 1827

Genus *Eunicites* Ehlers, 1868

*Eunicites orobicus* n. sp.

*Diagnosis:* subelliptical jaws slightly protruding beyond forceps lateral borders, closely side by side along a central junction line and showing denticulate front borders. Smooth surfaced mandibular processes. Short and completely joined carriers

forming a triangular complex. Strongly hooked forceps not protruding beyond the lateral borders of the jaws. Right maxilla IV with 7 teeth, left maxilla IV with 3 teeth. Two neuropodial aciculae for each parapodium. Presence of notopodial aciculae and compound falcigers.

*Etymology*: referring to the Orobic Prealps, where Ponte Giurino is located.

*Geological age*: Lower Rhaetian (Upper Triassic).

*Material*: 1 specimen (Fig. 1). 8779A and 8779B (part and counterpart, holotype).

*Description*: the examined specimen is preserved both as part and counterpart of a 3 cm long fragment corresponding to the anterior extremity of the body. The only evident features are body outline, pharyngeal armature and chaetae.

The pharyngeal armature (Fig. 2) is 6 mm long and includes jaws, mandibular processes and maxillae. Excluding carriers and forceps, the other elements of the mouth apparatus are clearly evident in the part, where they appear as three-dimensional mineralized reliefs. At the contrary, carriers and forceps are better preserved as imprints in the counterpart. The left jaw is preserved in its basal part only, whereas the right one is full-preserved. The latter shows a denticulate front border, equipped with 5-6 teeth, and an undulate back border. The jaws lateral borders are smooth, rounded and 2.5 mm apart: the internal ones are joined each other for 1/3 of their length. The maximum distance between the anterior and posterior borders of the right jaw shifts from 0.5 mm, near the articulation hinge with the left jaw, to 1.2 mm, near the external border.

Behind the jaws, two mineralized, joined and smooth subrectangular plates represent the remains of the mandibular processes. At the rear of these plates, the mandibular processes are completely hidden by the maxillary apparatus, so that it is impossible to investigate their shape and development. Immediately at the back of the same plates, the maxillae IV are preserved as two subcircular structures. The left maxilla IV is equipped with 3 teeth along the anterior border, the right one owns 7 teeth in the same position; in both cases the teeth are quite raised from the maxillae surface. The different number of teeth characterizing the maxillae IV underlines the *Eunicites* relationships with the modern representatives of the genus *Eunice* Cuvier, 1817, in which the left maxilla IV always owns a smaller teeth number than the right one (Fauchald, 1992). The observation just exposed is useful to recognize that the *Eunicites orobicus* n. sp. maxilla IV that owns more teeth and that appears at the observer right side is really the right maxilla IV: the examined specimen consequently shows its dorsal surface. The forceps anterior extremity is hidden, in the part, by the presence of maxillae IV but, in the counterpart, the forceps clearly appear as strong, slightly arcuate and 3 mm long structures, separated at a maximum distance of 2.5 mm. The forceps do not reach the jaws back borders and they show a quite hooked anterior extremity. Another pair of maxillae is preserved between the forceps. They should be maxillae II or III and they show a denticulate internal border: the left element is equipped with 7 teeth, the right one anteriorly preserves only 2 teeth. In both the part and counterpart these subelliptical maxillae are preserved as imprints, with the exception of a small mineralized plate that represent the anterior extremity of the left one and that is clearly evident in the part only.

The triangular imprint of the carriers is evident in the counterpart, where it is 2.5 mm long. The maximum width of the carrier complex reaches 3 mm at the articulation hinge with the maxillary apparatus. Even if the two elements that comprise the carrier complex are not distinguishable, one can easily assume that they were symmetrical and completely joined along their median line.



Fig. 1 - *Eunicites orobicus* n. sp., part (8779A; A) and counterpart (8779B; B) (3 x).

Fig. 1 - *Eunicites orobicus* n. sp., impronta (8779A; A) e controimpronta (8779B; B) (3 x).

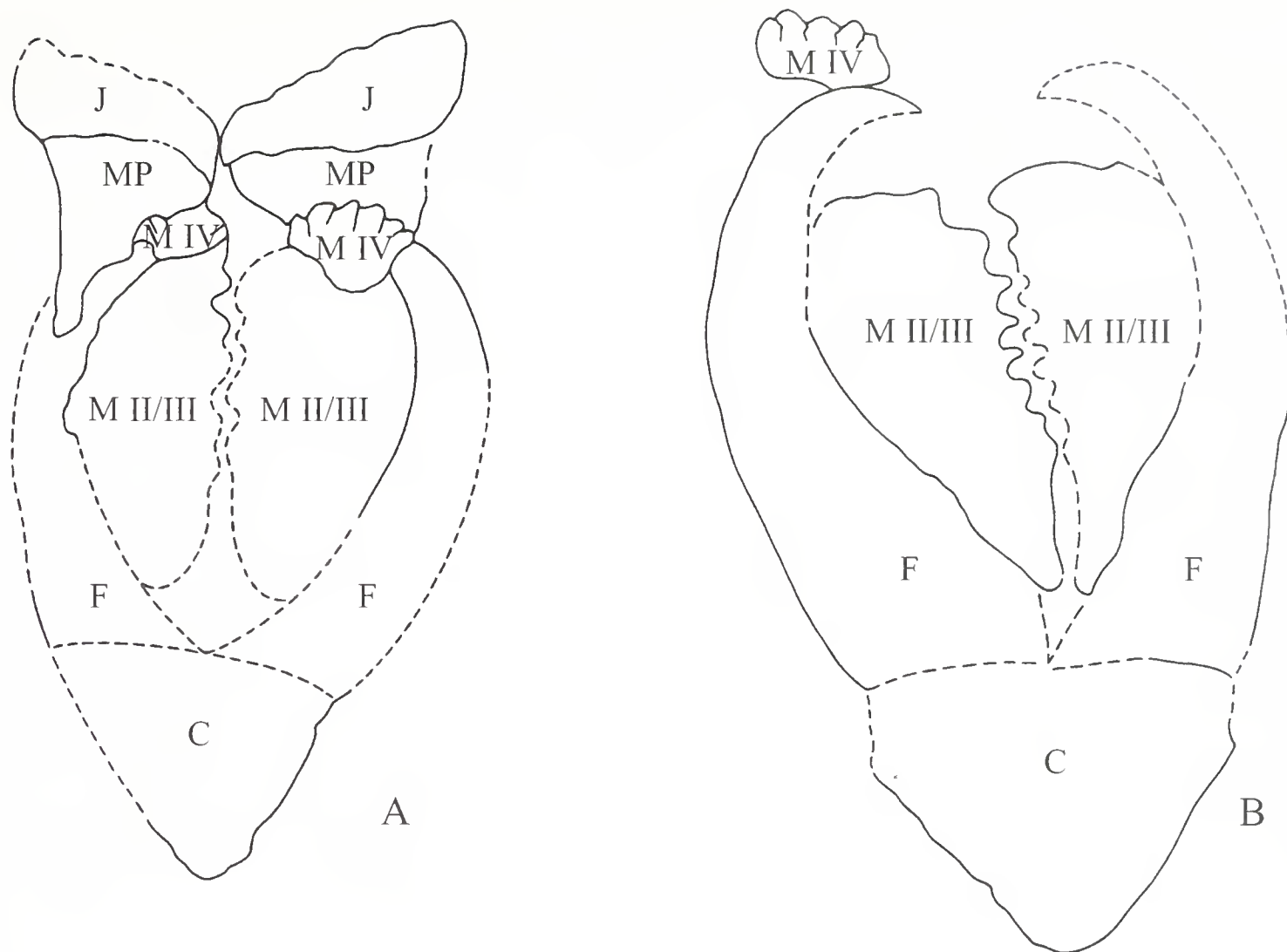


Fig. 2 - *Eunicites orobicus* n. sp., camera lucida drawing (13 x) of the part (8779A; A); and counterpart (8779B; B) of the pharyngeal armature: jaws (J), mandibular processes (MP), forceps (F), maxillae (M) and carriers (C).

Fig. 2 - *Eunicites orobicus* n. sp., disegno alla camera lucida (13 x) dell'impronta (8779A; A); e della controimpronta (8779B; B) dell'apparato boccale: mandibole (J), processi mandibolari (MP), forceps (F), mascelle (M) e carriers (C).

On the two sides of the body, several tufts of aciculae are preserved as far as 2 mm at the rear of the pharyngeal armature. Twenty-five tufts of aciculae can be counted along the left side of the part, 21 on the right one: they clearly testify the metameric subdivision of the body. The aciculae appear as straight, 3 mm long, 0.1 mm thick, black and shiny structures, associated in bundles of two elements for each parapodium. In consideration of the dorsal preservation of the holotype, these aciculae can be recognized as neuropodial. Moreover, the twelfth right tuft of aciculae is matched by two 2 mm long, 0.05 mm thick and straight rods that show the same preservation of the neuropodial aciculae. These rods should be interpreted as the notopodial aciculae that are always present and typically narrower than the neuropodial ones (Fauchald, 1992) in *Eunice* Cuvier, 1817, living genus strictly related to *Eunicites*.

In the part some tufts of aciculae of each body side appear distally attached to a rounded protuberance. Ten protuberances can be counted along the left side, 12 along the right one: they might represent the postsetal lobes of the parapodia. The protuberance attached to the tenth left tuft of aciculae is crossed by 4 straight, 0.15 mm thick and 0.1 mm long rods preserved in the same way of the aciculae: the authors interpret these structures as compound falcigers even if their morphological details are not preserved.

### Discussion and conclusions

The mouth apparatus features and the general body morphology of the examined specimen suggest its relationships with the family Eunicidae and the genus *Eunicites*. *Eunicites orobicus* n. sp. owns subelliptical jaws anteriorly bearing 5-6 teeth; the mandibular processes show a smooth surface and appear joined at least in the anterior part.

Denticulate jaws can be also found in *Eunicites affinis* (Massalongo, 1855) from the Eocene of Monte Bolca (Alessandrello, 1990b), characterized by oval jaws with 3-4 teeth and sharp lateral ends together with grooved mandibular processes joined for about 2/3 of their length.

The occurrence of eunicid polychaetes within Triassic has been already recorded by Gall & Grauvogel (1966), who described *Eunicites triasicus* Gall & Grauvogel, 1966 from the *Buntsandstein* of Grès a Voltzia, whereas all the other Mesozoic species up to now recorded (Ehlers, 1868 and 1869; Bracchi & Alessandrello, 2004, in press) are younger. In the same way of *Eunicites orobicus*, *Eunicites triasicus* owns subelliptical and anteriorly denticulate jaws, that show a major number (8-9) of teeth and, more similarly to *Eunicites affinis*, sharp lateral ends. Moreover, in *Eunicites orobicus* n. sp. the forceps are smooth surfaced, arcuate and hooked, not carinate and simply arcuate like those of *Eunicites triasicus*. Finally in *Eunicites orobicus* n. sp., along the internal borders of the maxillary plates (maxillae II or III) located between the forceps, at most 7 teeth can be counted, whereas in *Eunicites triasicus* the same structures are equipped with 16-17 teeth.

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### References

- Alessandrello A., 1990a - Studies on Permo-Trias of Madagascar. II. *Paleoaphrodite anaboranoensis* n. sp., a new species of polychaete annelid from the Lower Trias of Madagascar. *Atti Soc. it. Sci. nat. Museo civ. Stor. nat. Milano*, Milano, 131: 205-208.
- Alessandrello A., 1990b - A revision of the annelids from the Eocene of Monte Bolca (Verona, Italy). *Studi e ricerche sui giacimenti terziari di Bolca*, Verona, 6: 175-214.
- Alessandrello A. & Teruzzi G., 1986a - *Eunicites phoenicius* n. sp., a new fossil polychaete annelid of the Cenomanian of Hakel, Lebanon. *Atti Soc. it. Sci. nat. Museo civ. Stor. nat. Milano*, Milano, 127 (3-4): 321-325.
- Alessandrello A. & Teruzzi G., 1986b - *Paleoaphrodite raetica* n. gen. n. sp., a new fossil polychaete annelid of the Rhaetic of Lombardy. *Atti Soc. it. Sci. nat. Museo civ. Stor. nat. Milano*, Milano, 127 (3-4): 297-300.

- Alessandrello A., Bracchi G. & Riou B., 2004 (in press) - Polychaete, sipunculan and enteropneust worms from the Lower Callovian (Middle Jurassic) of la Voulte-sur-Rhône (Ardèche, France) *Mem. Soc. it. Sci. nat. Museo civ. Stor. nat. Milano*, Milano, 32.
- Arduini P., 1988 - *Microcaris* e *Atropicaris*: due generi della classe Thylacocephala. *Atti Soc. it. Sci. nat. Museo civ. Stor. nat. Milano*, Milano, 129: 159-163.
- Arduini P. & Brasca A., 1984 - *Atropicaris*: nuovo genere della classe Thylacocephala. *Atti Soc. it. Sci. nat. Museo civ. Stor. nat. Milano*, Milano, 125: 87-93.
- Arduini P., Pinna G. & Teruzzi G., 1982 - *Melanoraphia maculata* n. g. n. sp., a new fossil polychaete of the Sinemurian of Osteno in Lombardy. *Atti Soc. it. Sci. nat. Museo civ. Stor. nat. Milano*, Milano, 123 (4): 462-468.
- Arratia G. & Tintori A., 2001 - 'Pholidophoriforms' from the Norian (Late Triassic) of the Alps. In: III International Meeting on Mesozoic fishes (26-31 August 2001, Serpiano-Monte San Giorgio, Switzerland), Abstracts. Tintori A. (ed.). *Università Statale degli Studi di Milano*, Milano: 6.
- Bechly G., 1997 - New fossil odonates from the Upper Triassic of Italy, with a redescription of *Italophlebia gervasuttii* Whalley, and a reclassification of Triassic dragonflies (Insecta, Odonata). *Riv. Mus. Civ. Sc. Nat. 'E. Caffi'*, Bergamo, 19: 31-70.
- Bracchi G. & Alessandrello A., 2004 (in press) - The polychaetes (Annelida, Polychaeta) from the Cenomanian (Upper Cretaceous) of Lebanon, with an annotated check-list of the free-living fossil species. *Mem. Soc. it. Sci. nat. Museo civ. Stor. nat. Milano*, Milano, 32.
- Ehlers E., 1868 - Über eine fossile Eunice aus Solenhofen (*Eunicites avitus*) nebst Bemerkungen über fossile Würmer überhaupt. *Zeitschr. Wiss. Zool.*, Leipzig, 18 (3): 421-443.
- Ehlers E., 1869 - Über fossile Würmer aus dem litographischen Schiefer in Bayern. *Palaeontographica Abt. A*, Stuttgart, 17: 145-175.
- Fauchald K., 1992 - A review of the genus *Eunice* (Polychaeta: Eunicidae) based upon type material. *Smithsonian Contributions to Zoology*, New York, 523: 1-422.
- Gall J.-C. & Grauvogel L., 1966 - Faune du Buntsandstein III. Quelques annélides du Grès a Voltzia des Vosges. *Ann. Paléont.*, Paris, 53: 3-14.
- Garassino A. & Teruzzi G., 1993 - A new decapod assemblage from the Upper Triassic of Lombardy. *Paleontologia Lombarda, n. s.*, Milano, 1: 1-27.
- Gnaccolini M., 1965 - Il Trias in Lombardia. Studi geologici e paleontologici. XV. Calcare di Zu e Argillite di Riva di Solto: due formazioni del Retico. *Riv. It. Paleont. Strat.*, Milano, 71: 1044-1121.
- Jadoul F., 1985 - Stratigrafia e paleogeografia del Norico nelle Prealpi Bergamasche occidentali. *Riv. It. Paleont. Strat.*, Milano, 91: 479-512.
- Paganoni A. & Cirilli S., 1995 - Stratigraphical and paleobiological considerations on Norian (Upper Triassic) Argillite di Riva di Solto exceptional fossiliferous levels. Extended abstract of II International Symposium on Lithographic Limestones (July 1995, Cuenca, Spain): 111-112.
- Paganoni A. & Renesto S., 1995 - Taphonomy of Norian (Late Triassic) Argillite di Riva di Solto Formation, Bergamo (N. Italy). Extended abstract of IInd International Symposium on Lithographic Limestones, (July 1995, Cuenca, Spain): 113-114.

- Renesto S. & Paganoni A., 1995 - A new *Drepanosaurus* (Reptilia, Neodiapsida) from the Upper Triassic of Northern Italy. *N. Jb. Geol. Paläont. Abh.*, Stuttgart, 197 (1): 87-99.
- Stefani M., Arduini P., Garassino A., Pinna G., Teruzzi G. & Trombetta G., 1992 - Palaeoenvironment of extraordinary fossil biotas from the Upper Triassic of Italy. *Atti Soc. it. Sci. nat. Museo civ. Stor. nat. Milano*, Milano, 132 (2): 309-335.
- Tintori A., 1980 - Teeth of the selachian genus *Pseudodalatias* (Sykes, 1971) from the Norian (Upper Triassic) of Lombardy (N. Italy). *Riv. It. Paleont. Strat.*, Milano, 86: 19-30.
- Tintori A. & Sassi D. 1987. Pesci volanti del genere *Thoracopecterus* nel Norico Lombardo. Nota preliminare. *Riv. It. Paleont. Strat.*, Milano, 93(3): 337-346.
- Tintori A. & Sassi D., 1992 - *Thoracopecterus* Bronn (Osteichthyes: Actinopterygii): a gliding fish from the Upper Triassic of Europe. *J. Vert. Paleont.*, Lawrence, 12: 265-283.
- Tintori A., Muscio G. & Nardon S., 1985 - The Triassic fossil fishes localities in Italy. *Riv. It. Paleont. Strat.*, Milano, 91: 197-210.
- Whalley P., 1986 - Insects from the Italian Upper Trias. *Riv. Mus. Civ. Sc. Nat. 'E. Caffi'*, Bergamo, 10: 51-60.
- Wild R., 1995 - A juvenile specimen of *Eudimorphodon ranzii* (Reptilia, Pterosauria) from the Upper Triassic (Norian) of Bergamo. *Riv. Mus. Civ. Sc. Nat. 'E. Caffi'*, Bergamo, 16: 95-120.

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